

ARCHITECTURE PROGRAM

ARCH 4213 – Axially Loaded Concrete Columns

Homework

For each problem, determine the allowable ultimate load-bearing capacity P_u for each of the following short columns. Assume $F_y = 60$ ksi and $f'_c = 4000$ psi.

<u>Number</u>	<u>b (in.)</u> x <u>h (in.)</u>	<u>Bars</u>
1	16 16	8#9
2	12 12	8#8
3	12 24	12#10
	<u>Diameter</u>	
4	14 (spiral)	8#9
5	16 (spiral)	6#10

For each problem, design a short square, rectangular, or circular column as indicated. Also design the ties or spirals and draw a sketch of the column section showing all bar arrangements. Assume $F_y = 60$ ksi and $f'_c = 4000$ psi.

<u>Number</u>	<u>P_D (kips)</u>	<u>P_L (kips)</u>	<u>ρ_g (%)</u>	<u>Section</u>
6	200	200	4	Square
7	190	170	2	Rectangular, b=12
8	350	130	4	Circular – spiral
9	475	220	3.25	Circular – spiral